

E73-10715  
CR-133215

Date: May 4, 1973

To: ERTS Contracting Officer  
Code 245, GSFC  
Greenbelt, Maryland 20771

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From: *W. P. Mahlstede*  
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Re: Progress Report (Type I)

The following progress report summarizes work accomplished for the 2-month period ending April 30, 1973 with reference to Article II, Item 3 of the contract schedule outlined in #NAS5-21839.

- a. Remote Sensing in Iowa Agriculture (MMC #249).
- b. GSFC Identification Number of the Principal Investigator (UN-611).
- c. Any problems that are impeding the progress of the investigation: No major problems are impeding the progress of this investigation at this time.
- d. Accomplishments during this reporting period and those planned for the next reporting period: During this reporting period, ERTS-1 enlargements (mainly MSS5 and MSS6) and Miniadcol produced color slides (MSS5, MSS6 and MSS7) were compared to the ground truth at sites near Ames, Iowa and at Doon, Iowa with emphasis placed on crop identification and inventory. The NASA provided underflights flown on August 12, 1972 were an essential part of the ground truth. They provide identification of vegetation and probably more importantly, the amount of each vegetation type present at each test site. Field irregularities due to drainage, erosion, etc. are easily noted from these NASA provided underflights. This analysis is continuing, but the ERTS-1 imagery covering the western part of Iowa is probably the best imagery we presently have available. The underflights and the ERTS-1 coverage correspond within two days.

The test site at Doon, Iowa includes a small river valley and this has caused the field identification for that area to be a problem. Resolution limits identification because fields are irregularly shaped and the vegetation types present are quite diverse. In the area immediately adjacent to the flight line, as viewed on the Miniadcol produced color slides depicting the ERTS-1 coverage, the field configuration appears very distinct and at least four color field responses are present.

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Unclas 00715  
CSCL 02C G3/13  
(E73-10715) REMOTE SENSING IN IOWA  
AGRICULTURE Progress Report, period  
ending 30 Apr. 1973 (Iowa State Univ. of  
Science and Technology) 4 p HC \$3.00

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Exact ground truth for these areas is not immediately available; however, township estimates of major crop acreages are available through the State of Iowa Crop Reporting Service. For this reason, these township acreage estimates have been requested and Miniadcol color slides for selected townships in western Iowa have been produced through cooperation with the Iowa State Geologic Survey - Remote Sensing Laboratory located at Iowa City, Iowa. We hope to survey these selected townships in western Iowa and one entire county for amounts of corn and soybeans present in August 1972. These results will be included in the next reporting period progress report.

Examination of black and white 16" x 20" enlargements of the ERTS-1 70 mm product reveals that the above mentioned problem will occur in other parts of Iowa. In some areas the fields are very distinct; however, in other areas this is not true. Field boundaries are not as distinct due to the influence of the soils and topography present, which in turn limits the type of crops adaptable for production. ERTS-1 imagery covering the Missouri River flood plain and associated loess hills immediately east of the Missouri River in western Iowa illustrates this problem. Analysis of the crop distribution in Iowa will continue so that these problem areas can be noted.

Other work during this period has included preparation for the 1973 crop season ERTS-1 coverage of Iowa and the NASA provided spring underflight coverage over the four test sites. Field ground truth and soil surveys in selected areas are presently in progress.

e. Discussion of significant results and their relationship to practical applications or operational problems: The approach to vegetation identification and inventory used to date in this project does not include data processing and classification utilizing either computer compatible tapes or microdensitometer quantification of ERTS-1 imagery. Photo-interpretive methods have been used to date and this includes additive false color analysis using the I<sup>2</sup>S Miniadcol system. Enlarged black and white ERTS-1 imagery provides excellent synoptic coverage over large areas and this provides the vegetation type interpreter with a first tool. Analysis of field type using MSS bands individually gives the interpreter only shades of gray to base his decision. Combining the MSS bands and adding color through the I<sup>2</sup>S Miniadcol system provides the interpreter a greater degree of freedom in his decision making process. To date this has been both encouraging and discouraging. As stated previously, in certain areas of Iowa, fields appear very distinct and color differences between fields are quite distinct. In this case the interpreter can effectively place field boundaries. In other areas, however, resolution due to small field size and crop pattern diversity make the interpreters job of placing field boundaries and estimating acres very difficult. The information potentially available from ERTS-1 can be of great use in state planning and as an aid to the present crop survey programs. For this reason we will continue investigating this method of analysis of the ERTS-1 imagery.

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f. There are no published articles, and/or papers, pre-prints, etc. at this time.

g. No recommendations concerning practical changes in operations are suggested at this time.

h. An addition to the standing order form is requested as follows: (see attached standing order form).

j. No data request forms have been submitted during this reporting period.

**(See Instructions on Back)**

GSFC 37-3 (7/72)

**INVESTIGATOR'S COPY**